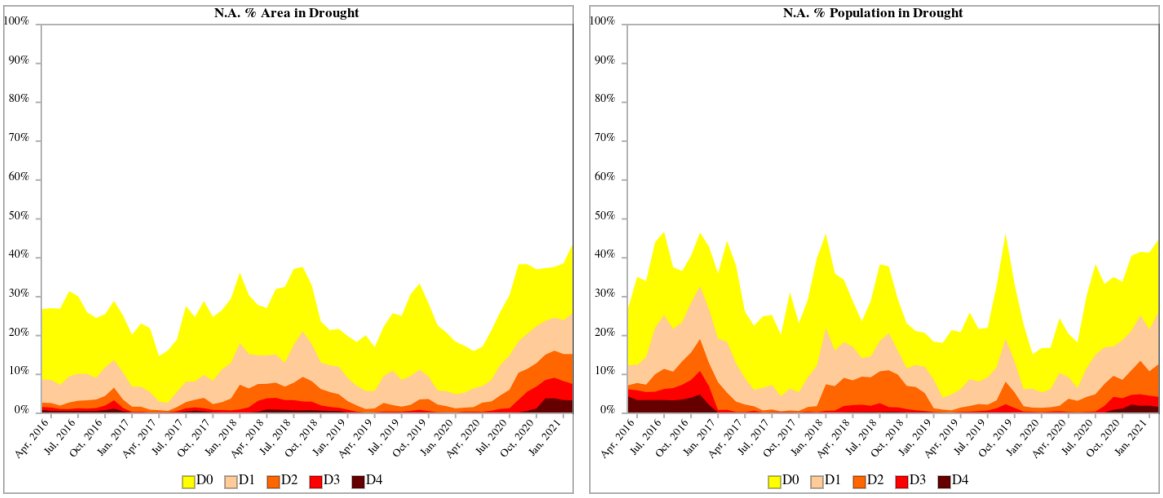
North American Drought Monitor – February 2020

At the end of February 2021, moderate to exceptional drought (D1-D4) affected 25.5% of the area and 25.9% of the population of North America. The percent area value was 1.7% more than the value for the end of January 2021. The percent population value was 4.5% more than the value for the end of January. At the end of February, 85.7% of the Rio Grande/Bravo River Basin and 64.0% of the Great Plains were in moderate to exceptional drought, 24.3% of the Columbia River Basin was in moderate to extreme drought (D1-D3), and 4.1% of the Great Lakes Basin was in moderate drought. The North American Great Plains extends across the United States and into adjacent parts of northeast Mexico and the southern Prairies of Canada. The percent area values for the Great Plains and Great Lakes Basin increased compared to the end of January, while the percent area values for the Columbia and Rio Grande/Bravo River Basins decreased compared to the end of January.



Percent area (left) and percent of the population (right) of North America in drought, March 2016-February 2021.

CANADA: In the month of February, large portions of the Canadian Prairies and southern Ontario received below- to well below-average precipitation, increasing the drought severity and extent. Western Canada experienced well below-average temperatures, with some regions experiencing more than 7 degrees Celsius colder than average. Precipitation was also well below-average, particularly in the agricultural regions of the Prairies; this led to significant expansions of drought and dry conditions throughout Alberta, Saskatchewan and Manitoba. Portions of interior British Columbia also received below-average precipitation resulting in the development of Abnormally Dry (D0) conditions in northeastern British Columbia. Central Canada also experienced cooler than average temperatures and below-average precipitation through February. As a result, a large area of D0 was added in central Ontario into Quebec and existing dry conditions in southern Ontario were expanded. Atlantic Canada received above-average temperatures and precipitation leading to improvements to dry conditions, especially in Nova Scotia and Prince Edward Island. The northern regions of Canada saw only minimal expansion of dry conditions following below-average precipitation in the last three months. Approximately thirty-five percent of the country was considered

Abnormally Dry (D0) or in drought; this includes seventy-five percent of the agricultural landscape.

Pacific (BC)

In the month of February, British Columbia saw some expansions of Abnormally Dry (D0) conditions, though the province continued to be drought-free. In the northeastern corner of the province, precipitation received in the last three months was 25 to 75 percent below-average; this led to the expansion of Abnormally Dry (D0) conditions from Fort St. John towards Fort Nelson. Included in this expansion was Chetwynd which recorded its third driest December to February period on record with only 50.9 percent of average precipitation. A pocket of D0 also developed surrounding Prince George; this area received 25 to 50 percent below-average precipitation over the past 3 months. This represents the second driest three-month period on record from December to February for this region. Further south along the Alberta border, Abnormally Dry (D0) conditions expanded and now span from Golden to Cranbrook. In the area surrounding Golden, 90-day precipitation percentiles show below- to well below-average precipitation. Fourteen percent of the province was considered to be Abnormally Dry (D0), which accounts for nearly thirty-two percent of the agricultural landscape.

Prairies (AB, SK, MB)

The month of February brought well below-average precipitation in addition to well below-average temperatures across the Prairies. In fact, a dry spell during which no measurable precipitation was received across all of southern Saskatchewan and Manitoba lasted 25 to 30 days. For this reason, abnormally dry and drought conditions intensified and developed further west to cover much of the region. There was a widespread expansion of Abnormally Dry (D0) conditions in the central and southern Prairies, particularly in Alberta and Saskatchewan, as dry conditions have persisted over the last several months. In southwestern Alberta, a small pocket of Moderate Drought (D1) was added surrounding Claresholm and towards the west. This area received extremely low precipitation in the last two months as precipitation was between the second and fifth percentiles. In the southeast corner of Alberta, Moderate Drought (D1) expanded from the U.S. border north to include Medicine Hat. A lack of precipitation in the last three months, according to very low precipitation percentiles and the Standardized Precipitation Evapotranspiration Index (SPEI), led to the degradation in this area. In central Alberta, Moderate Drought (D1) expanded surrounding Edmonton due to moderately low to very low precipitation percentiles in the last six months. This pocket of drought expanded further east towards the Saskatchewan border and reached as far as North Battleford due to exceptionally low precipitation percentiles in the last three months. North Battleford had its driest month on record, with only five percent of average precipitation in February, and its driest three-month period from December to February. Moderate Drought (D1) also expanded in eastern Saskatchewan towards Prince Albert and Humboldt where very low to extremely low precipitation was received in the last three months. Prince Albert had its fourth driest three-month period on record, going back 134 years, with only 49 percent of average precipitation from December to February. Meanwhile in southern Saskatchewan, Severe Drought (D2) expanded further west to include the area of Swift Current to Shaunavon. These regions received exceptionally low precipitation, below the second

percentile, in the past 90 days and are now at a significant precipitation deficit since September. Areas west of this region received sufficient moisture earlier this winter and therefore saw expansions of Moderate Drought (D1) rather than Severe Drought (D2). Manitoba continues to experience Severe Drought (D2) throughout much of the agriculture portion of the province. The drought region expanded towards the north, as precipitation was exceptionally low in the last three months. Extreme Drought (D3) did not develop in southern Manitoba as we have not yet seen impacts of the severe precipitation deficits given the current winter season. However, there is the potential for rapid degradation of drought should conditions continue as spring approaches. About sixty percent of the Prairie region was classified as either Abnormally Dry (D0), in Moderate Drought (D1) or in Severe Drought (D2); this includes nearly ninety-three percent of the region's agricultural landscape.

Central (ON, QC)

Below-average precipitation across the Central region led to significant expansions of Abnormally Dry (D0) conditions and continued and worsening drought throughout the month of February. Northwestern Ontario received less than 75mm of precipitation in the last 90 days resulting in Moderate Drought (D1) to expand slightly eastwards and Severe Drought (D2) to persist around Dryden. Abnormally Dry (D0) conditions developed in central Ontario, from Sudbury to Timmins and towards Val-d'Or, QC, where 50 to 75 percent below-average precipitation, below the second percentile, was received in the last two months and 25 to 50 percent below-average precipitation in the last three months. Furthermore, a substantial area of D0 conditions developed further north as far as James Bay and into Quebec towards the St. Lawrence River. In southern Ontario, Abnormally Dry (D0) conditions also expanded and now cover nearly all of the southern region, with the exception of a small pocket west of Niagara Falls. This degradation was the result of precipitation below the 20th percentile in the last three months. Pockets of Moderate Drought (D1) were added surrounding Chatham, including Windsor and Sarnia, and from Stratford towards St. Thomas. These areas saw precipitation below the fifth percentile in the last three months. In addition to the expansion of Abnormally Dry (D0) conditions in central Quebec, pockets of Moderate drought (D1) remained around Sherbrooke and St-Jean-sur-Richelieu. However, previously-reported D0 pockets in northern Quebec were removed as satellite-derived data identified near- to above-average precipitation in the last 90 days. Thirty-eight percent of the Central region remains Abnormally Dry (D0), in Moderate Drought (D1) or in Severe Drought (D2); this includes nearly fifty-nine percent of the agricultural landscape.

Atlantic (NB, NS, PEI, NL)

The Atlantic region saw improvements to dry conditions in February, particularly in Nova Scotia and PEI, as above-average precipitation was received throughout the month. In Nova Scotia, Abnormally Dry (D0) conditions were reduced throughout much of the mainland and on Cape Breton Island. However, pockets remained around North Sydney and Chéticamp on Cape Breton Island and on the mainland from New Minas towards Truro. This area received below-average precipitation in the last 60 to 90 days. In PEI, Abnormally Dry (D0) conditions were reduced slightly, though an area remained from Summerside to Tignish. New Brunswick no longer experienced D0 conditions as a pocket previously reported around Oromocto was removed; slightly above-average precipitation, about 10 to 25 percent above-

average, was received in the area within the last three months. Satellite-derived data for the past three months also showed near-average precipitation in parts of Newfoundland's interior, which led to the reduction of D0 as well as slight shifts across the west coast of the island. Only a small pocket of drought persisted in Newfoundland surrounding Pasadena. Almost sixteen percent of the Atlantic region is classified as Abnormally Dry (D0) or in Moderate Drought (D1); this includes approximately eighteen percent of the region's agricultural landscape.

Northern (YT, NWT)

Only minimal changes were seen in the Northern region in the month of February as Abnormally Dry (D0) conditions expanded slightly. A large expanse of D0 remained in northern Yukon and NWT including Old Crow, YT which had its fifth driest February on record. This pocket expanded to the northern coast as well as slightly further south to include Fort Good Hope and Tulita, NWT. This change was the result of only 25 to 50 percent of average precipitation being received in the last three months. Abnormally Dry (D0) conditions also remained in the area from Yellowknife to Hay River, NWT and slight changes were made to a pocket of D0 along the Alaska border. Approximately twenty percent of the Northern region is classified as Abnormally Dry (D0).

UNITED STATES: Two weeks of historically cold weather arrived during February across the Plains, Midwest, and mid-South, following a previously mild winter. Southern Texas bore a disproportionate share of the agricultural damage, as the coldest weather since December 1989 froze citrus and winter vegetables. In addition, the Arctic blast may have resulted in long-term injury to citrus trees in Texas and could adversely affect the next sugarcane harvest in both Louisiana and Texas.

The severe cold wave, which began to overspread the nation's mid-section during the weekend of February 6-7, was accompanied by two significant winter storms. Both systems followed a similar path into the Northwest and across the southern Plains and mid-South, causing widespread travel disruptions while delivering snow, sleet, and freezing rain. In Texas and neighboring areas, mid-month power outages caused a chain reaction of adverse impacts that included potable water shortages; frozen and broken water pipes; cattle and poultry deaths; and ornamental and greenhouse losses.

Monthly temperatures averaged at least 10°F (more than 6°C) below normal in many locations across the Plains, mid-South, and upper Midwest. Cold air also seeped into the Northwest, but areas largely spared from the severe cold spell included California, the Great Basin, and the Southwest, as well as the Atlantic Coast States. February readings averaged more than 5°F (3°C) above normal in parts of southern Florida.

Across portions of the Great Plains, drought—along with potential impacts from extremely cold weather—left one-fifth to one-third of the winter wheat rated in very poor to poor condition by late February in several states, including Texas, Colorado, Kansas, and Nebraska. Some of the most significant exposure of wheat—lack of snow cover and sub-

zero temperatures—occurred across the central Plains, along with minor production areas in northeastern Montana and parts of the western Dakotas.

During the first 2 months of the year, drought coverage remained nearly steady at 45 to 47 percent of the Lower 48 States, according to the U.S. Drought Monitor, down slightly from a December 2020 peak of 49.6 percent. In February, significant improvement in the drought situation was mostly limited to a swath stretching from the Northwest to the northern and central Rockies. Portions of the northern Plains and Southwest noted worsening drought. Notably, California's key watershed areas saw the return of drier-than-normal conditions, following late-January storminess. Meanwhile, the middle and southern Atlantic States received locally heavy precipitation, leading to lowland flooding. Toward month's end, excessive rainfall in the Kentucky River basin and environs contributed to moderate to major flooding, while a much broader region stretching from northeastern Texas into the central Appalachians and Ohio Valley experienced mostly minor flooding.

According to preliminary data provided by the National Centers for Environmental Information, the contiguous United States experienced its 19th-coldest, 50th-driest February during the 1895-2021 period of record. The nation's monthly average temperature of 30.6°F (-0.8°C) was 3.2°F (1.8°C) below the 1901-2000 mean, while precipitation averaged 1.99 inches (50.5 mm)—93 percent of normal. It was the nation's coldest February since 1989 and fifth coldest since the Dust Bowl era, behind 1960, 1978, 1979, and 1989.

State temperature rankings ranged from the sixth-coldest February in Kansas, Nebraska, and Oklahoma to the 21st-warmest February in Florida. Top-ten rankings for cold February weather were also noted in Arkansas, Iowa, and Missouri. Illinois and Texas—both eleventh coldest—were just outside the top ten. Meanwhile, state precipitation rankings ranged from the 11th-driest February in Kansas and the 12th driest in Minnesota and North Dakota to top-ten wetness in the Carolinas.

The two months prior to February were on average rather mild and dry, leaving the nation with its 29th-warmest, 26th-driest winter on record. Across the Lower 48 States, the December-February average temperature of 33.6°F (0.9°C) was 1.4°F (0.8°C) above the 20th century mean, while precipitation averaged 6.10 inches (154.9 mm)—90 percent of normal. Only a handful of states strayed into top-ten territory for winter rankings. It was the third-warmest winter in Maine and the third-driest winter in North Dakota. Virginia cracked the top ten for winter wetness, ranking ninth.

Northeast: Drought coverage in the Northeast declined slightly during February from 4.6 to 3.9 percent. As recently as October 2020, more than one-half of the Northeast was experiencing drought. By March 2, lingering moderate drought (D1) was confined to Vermont and small parts of New Hampshire and New York.

Southeast: By March 2, moderate drought (D1) covered just 1.4 percent of the Southeast—all confined to Alabama. Abnormal dryness (D0) extended into parts of Florida and a tiny sliver of western Georgia. Drought has not covered more than 2 percent of the Southeast since June 2, 2020.

South: A wide range of conditions existed across the South. From the Mississippi Valley eastward, there was little or no drought by March 2; pockets of moderate drought (D1) were limited to small areas in Louisiana and Mississippi. Farther west, however, moderate to exceptional drought (D1 to D4) was affecting 54 percent of Texas and 14 percent of Oklahoma. On February 28, one-third (33 percent) of the winter wheat in Texas was rated in very poor to poor condition, according to the U.S. Department of Agriculture.

Midwest: During February, Midwestern drought coverage remained nearly steady at about one-tenth (9 to 11 percent). Some of the most significant drought (D1 to D3, or moderate to extreme drought) persisted across the upper Midwest, including portions of Minnesota and western Iowa. By late February, a previously extensive Midwestern snow cover quickly retreated amid a return to mild weather; by March 1, lingering snow coverage was mostly limited to Michigan, Minnesota, and Wisconsin, along with northern Illinois and parts of Iowa.

High Plains: During February, significant drought continued to grip the High Plains, with coverage of moderate to exceptional drought (D1 to D4) nearly steady at 82 to 84 percent. Winter wheat continued to struggle in some areas amid drought and following the severe February cold outbreak; by February 21, North Dakota led the region with 33 percent of its wheat rated in very poor to poor condition, followed by Colorado (29 percent), Kansas (26 percent), Nebraska (22 percent), Wyoming (20 percent), and South Dakota (16 percent). On the same date, topsoil moisture was rated more than one-half very short to short in Wyoming (87 percent), Colorado (73 percent), North Dakota (72 percent), and South Dakota (62 percent). In North Dakota, the 6-month period from September 2020 – February 2021 was the driest such period on record, supplanting 1952-53.

West: The 6-month period from September 2020 – February 2021 was the second driest on record in Utah and third driest in Nevada and Arizona. Also achieving a top-ten ranking for September-February dryness were California (seventh driest) and New Mexico (ninth driest). From California into the Southwest, the combination of consecutive, drier-than-normal winter wet seasons (2019-20 and 2020-21) and a poorly performing 2020 monsoon season left nearly one-half (42 percent) of the Western region in extreme to exceptional drought (D3 to D4) by March 2. In fact, drought covered 80 percent of the West by early March, despite some February improvement in the Northwest. In the core Southwestern drought area, D3 to D4 was in place by March 2 across 90 percent of Utah, 85 percent of Arizona, 82 percent of New Mexico, 76 percent of Nevada, and 57 percent of Colorado. Water shortages have become more acute in parts of the Southwest, with statewide reservoir storage on March 1 in New Mexico standing at 43 percent of average.

Alaska, Hawaii, and Puerto Rico: During February, Alaska's coverage of abnormal dryness (D0) increased slightly from 19 to 21 percent, due to low snowpack in some northern and eastern watersheds. Meanwhile in Hawaii, locally heavy rainfall reduced statewide drought coverage to 10 percent by March 2, down from 12 percent a month earlier. Elsewhere, Puerto Rican dryness (D0) and moderate drought (D1) expanded in February, amid a warmer- and mostly drier-than-normal weather regime. Puerto Rico's drought footprint doubled during February from 9 to 18 percent, although coverage was limited to the northwestern part of the island.

MEXICO: Scarce rainfall fell in the north, northeast and the eastern corridor, while the rest of the country did not receive precipitation in February; however, rainfall was above average only in small portions in the north, northeast and the Yucatan Peninsula. This precipitation was the result of the passage of five frontal systems, trough lines and the subtropical jet stream influence. In recent months, rainfall was absent in the central and central-west regions. Therefore, moderate to severe drought (D1 to D2) increased in the northern and central-western states. In the south Pacific, moderate to extreme drought (D1 to D3) remains with minimal changes. As of February 28, 63.58% of the country was in moderate to exceptional drought (D1 to D4), an increase of 5.94% compared with the last January drought assessment. The 7.9 mm of rainfall on the national level was 56.4% below the long-term (1941-2020) February's average of 18.1 mm, ranking as the 7th driest February. The national mean temperature of 18.0 °C was 0.2 °C above average and ranked in the top third of the historical data, as the 19th warmest February, according to temperature records since 1953. Temperatures were cooler than average in the northeastern due to the intense cold air mass that affected during middle of the month. From January 1 to March 4, the states with the largest area burned by fires were the State of Mexico, Baja California, Oaxaca, Chiapas, Puebla, Michoacán, Morelos, Guanajuato, Zacatecas and Chihuahua, which together accounted for 23,333 hectares, this is 83% of the total area burned nationwide, according to the Weekly Forest Fire Report from the National Forestry Commission (CONAFOR). Of the 20 main dam systems in the country, 7 keeps storage equal to or above the average, none system is close to the average and 13 systems reports below-average storage, according to the National Water Commission (CONAGUA) report on March 8.

Northwest or North Pacific (Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit): These states cover approximately 21% of the national territory. Only Baja California and eastern Sonora received some precipitation, placing Baja California as their sixth driest February. Overall, there was no major wetness input from winter systems; instead, most of this region had slightly colder than average temperatures. As of February 28, 66.9% of this region is in moderate to exceptional drought (D1-D4), a slight increase of 0.7% from the assessment on January 31.

Northern (Chihuahua, Coahuila, Durango, Zacatecas and San Luis Potosí): These states make up 33.4% of the country's land area. Chihuahua and Coahuila received precipitation and light snowfall, which resulted in a slight reduction of drought conditions in the north of these two states. The rest of the northern states did not receive precipitation and drought conditions remained with minimal changes. San Luis Potosi and Zacatecas recorded their fourth and sixth driest February, respectively. Temperatures were colder than average in northern Chihuahua and Coahuila, due to an intense cold air mass that affected the north and northeast of the country. Durango, Zacatecas and San Luis Potosí had warmer than average temperatures. As of February 28, 89.5% of this region is in moderate to exceptional drought (D1-D4), an increase of 6.8% from January assessment.

Northeast (Nuevo León and Tamaulipas): This region accounts for 7.3% of the national territory. The region received minimal rainfall, mainly in southern Tamaulipas. The highlight of the month was the colder than average conditions due to the intense cold air mass that

covered the southeastern US and extended into northeastern Mexico. An imbalance between load and generation in the electrical system caused blackouts in northern and northeastern states these days. Throughout the month, there were up to frosty 10 days in the north of the two states. On February 28, 83.1% of the region is in moderate to extreme drought (D1-D3), an increase of 8.2% from the latest assessment.

Central-West (Aguascalientes, Jalisco, Guanajuato, Colima and Michoacán): These states represent 9.3% of the national territory. For second month, this region did not receive significant rainfall and drought areas continued increasing. In February, Colima was the state with the worst balance, recording their driest February, while Michoacán and Jalisco recorded their seventh and eleventh driest December-February period. Temperatures were warmer than average in all the states in this region. The lack of rainfall continues to worry farmers. The Central-West region recorded the largest increase in drought area of the country; as of February 28, 82.9% of this region is in moderate to extreme drought (D1-D3), an increase of 18.6% from the latest January assessment.

Central-South (Querétaro, Hidalgo, State of Mexico, Tlaxcala, Puebla, Morelos and Mexico City): This region represents 5.2% of the national territory. The absence of rainfall continued in the region. The Cutzamala basins continue with low storage capacity, reductions in water supply to Mexico City began in February. The Cutzamala System transports water from Michoacán (where it begins), passing through the State of Mexico to reach Mexico City; it is 322.32 kilometers long and is currently the system responsible for supplying drinking water to more than 21 million inhabitants in the country's capital. On February 28, moderate to severe drought (D1-D2) was observed throughout the Cutzamala river basin. As of March 8, it was reported that the storage of the 3 main water reservoirs of the Cutzamala System (El Bosque, Villa Victoria and Valle de Bravo), which supply part of the Metropolitan Zone of the Valley of Mexico was at 51.8%, below the historical average for this date, which is at 73.9%; 40.8% of this region is in moderate to severe drought (D1-D2), an increase of 14.7% respect to one month ago.

Gulf of Mexico (Veracruz and Tabasco): These states along the Gulf of Mexico constitute 4.8% of the country's land area. Frontal systems brought some rainfall in Veracruz and Tabasco, but unlike previous month, it was below average. Tabasco recorded their eighth driest February, although still has the second wettest period in the last six months. Temperatures were close to average in both states. Northern Veracruz remains in moderate drought (19.3% of the entire state), while abnormally dry areas (D0) emerged in southern Veracruz.

South Pacific (Guerrero, Oaxaca and Chiapas): These states comprise 11.9% of the national territory. Guerrero and Oaxaca constitutes another important drought core. Of these three southern states, Guerrero has the most degraded conditions, with 79.9% of its territory is in moderate to extreme drought (D1-D3). Chiapas still retains moisture over the last six months, but is beginning to degrade when considering the last three months, so that, an area in the west of this state has been classified as abnormally dry (D0). Temperatures were warmer than normal on the coasts of Guerrero and Oaxaca and throughout the state of Chiapas, this increase the risk of fires in all three states.

Yucatán Peninsula (Campeche, Quintana Roo and Yucatán): It comprises 7.1% of the national territory. Once again, above-average rainfall was recorded in most of these states, mainly in Yucatan and northern Quintana Roo, although in Campeche, rainfall was lower. Temperatures were slightly above average in these states, remaining the danger of fires. The area continues to without drought conditions.